DOCUMENT RESUME

ED 037 949 EF 004 129

AUTHOR	Higgins, E. Eugene; And Others
TITLE	Science Facilities Planning Aids. March 1964. College and University Physical Facilities Series.
INSTITUTION	Office of Education (DHEW), Washington, D.C. Div. of Higher Education.
REPORT NO	OE-51004-2A
PUB DATE	Mar 64
NOTE	16p.
AVAILABLE FROM	Division of Higher Education, Office of Education, U.S. Department of Health, Education and Welfare, Washington, D.C.
EDRS PRICE	EDRS Price MF-$0.25 HC Not Available from EDRS.
DESCRIPTORS	*Bibliographies, College Planning, *Higher Education, Physical Facilities, *Science Facilities, *Science Laboratories

ABSTRACT

A list is presented of science buildings at institutions of higher education; buildings are identified by name as reported by the institution, and dates of initial occupancy are shown. A table is included showing regional distribution of instructional laboratories in the science buildings reported--(1) by number and size, (2) by capacity in student stations, and (3) by student station sizes. A bibliography on science facilities planning is also included. (FS)

ED037949

Division of Higher Education

HE

College and University Physical Facilities Series

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Office of Education

March 1964 OE-51004-2A

SCIENCE FACILITIES PLANNING AIDS

by E. Eugene Higgins, Specialist for Physical Facilities,
Mary B. Fuller, Research Assistant, and
Linda L. Wright, Research Aide

Through the "Inventory of College and University Physical Facilities, December 31, 1957" (part 3 of a 5-part survey[1/] and now in process), several listings of institutional buildings reported as occupied for the first time in the calendar decade 1948-57 were compiled. Since requests for such information from higher education institutions indicate that interest in construction is great in the category of science buildings, this release presents the science building listing (list A), which follows. Buildings are identified by name as reported by the institution, and dates of initial occupancy are shown. Other listings of buildings will be offered through this series. (See table 1 of OE-51004-1, Inventory of Higher Education Physical Facilities, for Inventory response data by State; 84.9 percent of the institutions in the aggregate United States participated, representing 95.5 percent of the fall 1957 enrollment.)

Table 1 shows regional distribution, for the contiguous States, of instructional laboratories situated in the science buildings reported in list A: (1) by number and size, (2) by capacity in student stations, and (3) by student station sizes. The assignable area of an instructional laboratory includes not only the laboratory itself but also any auxiliary space devoted exclusively to the functions of the laboratory. Assignable area is measured from the inside walls at floor level. A student station is considered to be a place at which a student may be located--for example, a laboratory table or a lecture-room seat. The area of a laboratory student station is therefore the assignable area required to provide all accommodations necessary for one student.

A bibliography on science facilities planning is included as list B.

The Physical Facilities Series is designed to present, as it becomes available, preliminary and other information concerning college and university physical facilities. A separate Finance Series presents information on matters related to higher education finance. Data can thus be disseminated prior to publication of the complete report.

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

1/ Part 3 of a 5-part study by the Office of Education, College and University Facilities Survey.

EF 004 129

Table 1.--Number, assignable area, laboratory size, laboratory capacity, and student station size of instructional laboratories in science buildings[1/] reported to have been constructed during the 1948-57 calendar decade by higher education institutions participating in the College and University Facilities Survey, Part 3, as of December 31, 1957, by region: Contiguous States

Instructional laboratories	Contiguous States	Region			
		Northeast[2/]	North Central[3/]	South[4/]	West[5/]
a. Number of laboratories	2,729	431	648	1,051	599
b. Total assignable area (sq.ft.)[6/]	2,532,400	430,800	579,600	918,500	603,500
c. Number of student stations	63,341	9,065	15,446	24,497	14,333
LABORATORY SIZE (sq.ft.)					
d. Mean (line b ÷ line a)	928	1,000	894	874	1,008
e. Median	873	885	849	805	983
f. Interquartile range	686-1,098	782-1,220	668-1,076	652-948	777-1,198
LABORATORY CAPACITY (student stations)					
g. Mean (line c ÷ line a)	23	21	24	23	24
h. Median	22	20	21	22	24
i. Interquartile range	16-27	14-26	13-25	17-27	16-27
STUDENT STATION SIZE (sq.ft.)					
j. Mean (line b ÷ line c)	40.0	47.5	37.5	37.5	42.1
k. Median	42.0	48.1	42.1	39.9	46.7
l. Interquartile range	33.5-52.1	34.9-70.8	33.8-54.8	32.1-44.7	34.8-53.1

1/ Exclusive of 14 science buildings for which incomplete data were received.

2/ Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont.

3/ Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin.

4/ Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, West Virginia, District of Columbia.

5/ Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming.

6/ Includes all of the auxiliary space devoted to the functions of the laboratory.

List A.--Science Buildings Reported To Have Been Occupied for the First Time During the 1948-57 Calendar Decade: Aggregate United States

Note: Code numbers in parentheses indicate type of research for which facilities are included: 31, astronomy; 32, biology; 33, chemistry; 35, physics; 36, other physical sciences.

State and institution	Name of building	Year
Alabama		
Athens College	Waters Hall (32)	1957
Auburn University	Animal Disease Research Laboratory (32)	1955
	Burke Dairy Laboratory (32)	1952
	Coccidiosis Laboratory (32)	1952
Howard College	Biology Building	1957
The Marion Institute	Chemistry Building	1953
Spring Hill College	Chemistry Building	1957
Tuskegee Institute	Carver Laboratories (33)	1950
University of Alabama	Physics Building	1949
University of Alabama, Medical Center	Basic Science Building	1951
Arizona		
Arizona State College, Flagstaff	Science Building	1949
Arizona State University	Science Building	1950
Eastern Arizona Junior College	Science Building	1955
University of Arizona	Biological Science (32)	1956
Arkansas		
Agricultural, Mechanical and Normal College	Science Building	1950
John Brown University	Science Hall	1957
Ouachita Baptist College	Science Building	1951
Philander Smith College	Science Hall (35)	1952
University of Arkansas	Physical Science Laboratory (36)	1951
California		
Bakersfield College	Science and Engineering Building	1955
California State Polytechnic College	Science Building	1956
	Science and Classrooms	1955
Citrus Junior College	Chemistry Building	1953
Claremont Graduate School	Baxter Science Laboratories	1953
Coalinga College	Geology and Biology Building	1957
	Physics and Chemistry Building	1957
College of Marin	Science Building	1949
El Camino College	Chemistry Building	1955
	Life Science Building	1951
	Physics Building	1955
Fresno State College	Science Building-Wing C, D, E, F	1955
Fullerton Junior College	Science Building	1955
Humboldt State College	Science Building	1953
Long Beach City College	Life Science Building	1951
Long Beach State College	Science Building #2	1956
Los Angeles Pierce College	Anatomy, Muro Biology Building	1955
Monterey Peninsula College	Science Building	1948
Mount San Antonio College	Life Science Building	1953
	Physical Science Building	1949
Oceanside-Carlsbad College	Science Building	1956
Orange Coast College	Science Building	1957
Pacific Union College	Chemistry Building	1950
Reedley College	Science Building-Wing #2	1957
Sacramento State College	Chemistry Building	1953
	Life Science Building	1957
	Physical Science Building	1953
	Physics Building	1953
San Diego State College	Physics Building	1953
San Francisco State College	Science Building	1952
Shasta College	Science Building	1950
Stanford University	Electronics Research (35)	1951
	High Energy Laboratory (35)	1949
	Microwave Laboratory (35)	1949
	Organic Research Laboratory (35)	1949
	Physics Lecture Hall	1957
University of California, Berkeley Campus	Building HHSE 6 (32)	1950
	LT Laboratory (33)	1954
	BV Laboratory (32)	1952
	Building GHSE 11 (32)	1950
	Building GHSE 12 (32)	1950
University of California, Los Angeles Campus	Geology-Chemistry Building	1952

State and institution	Name of building	Year
California--con.		
University of California, Los Angeles Campus--con.	Life Science Building	1955
	Life Science-Plant Pathology Building	1950
University of Redlands	Hornby Hall	1957
University of Southern California	Aeronautics Building (36)	1948
	Bacteriology Building (32)	1948
	Chemical Building Wing	1950
	Navy Research Building (36)	1948
	Tlargi (33)	1955
Ventura College	Biology Building V	1955
	Chemistry Building Unit M	1955
Colorado		
University of Colorado	Isotopes Laboratory	1949
	Lester (Physics) Building	1950
University of Denver	Building Dri-5 (33)	1948
Connecticut		
Connecticut College	Hale Laboratory (33)	1954
University of Connecticut, Hartford	Science Building	1953
Yale University	Accelerator Building #1 (35)	1953
	Accelerator Building #2 (35)	1955
	Biological Laboratory (32)	1951
	Gibbs Laboratory (36)	1955
	Observatory-Bethany (31)	1957
Delaware		
University of Delaware, Lewes	Bayside Marine Biological Laboratory (2 buildings)	1954
District of Columbia		
Howard University	Biology-Greenhouse Building	1956
Florida		
Chipola Junior College	Natural Science Building	1957
Florida Agricultural and Mechanical University	Jones Hall	1955
Pensacola Junior College	Science Building	1957
St. Petersburg Junior College	Science Building	1956
University of Miami	Agassiz (Virginia Key) (36)	1953
	Marine Laboratory (Main Building) (36)	1956
Georgia		
Abraham Baldwin Agricultural College	Science Building	1954
Agnes Scott College	Bradley Observatory	1949
	Campbell Science Hall	1951
Albany State College	Science Building	1954
Atlanta University	Chemistry Building	1953
Emory University	Biology Building	1950
	Biology Greenhouse (32)	1955
	Geology Building	1950
Middle Georgia College	Science Building	1948
Morehouse College	Chemistry Building	1953
North Georgia College	Science Hall	1948
Hawaii		
University of Hawaii	Chemistry Hall (Bilger Hall)	1952
Illinois		
Blackburn College	F. W. Olin Science Building	1957
Millikin University	Scoville Science Hall	1953
Northern Illinois University	Science Building	1950
St. Xavier College	Science Building #4	1956
Southern Illinois University	Life Science Building	1954
	Life Science Animal House (36)	1954
	Life Science Greenhouses (36)	1951
University of Chicago	Accelerator Building (35)	1949
	Low Temperature Laboratory (35)	1957
	Research Institutes Building	1950
University of Illinois	East Chemistry Building	1950
Western Illinois University	Science Hall	1953
Indiana		
Indiana University, Bloomington Campus	Cosmic Ray Laboratory (35)	1956
	Geology Shop (35)	1956
	Jordan Hall (32)	1955
	Radioactive Isotope Laboratory (33)	1951

State and institution	Name of Building	Year
Indiana--con.		
Indiana University, Indianapolis Medical Campus	Laboratory Science Building	1951
St. Mary's College	St. Mary's Science Hall	1954
University of Notre Dame	Biology Greenhouse (32)	1950
	Lobund (32)	1949
	Nieuwland Science Building	1953
Iowa		
Drake University	Harvey-Ingham Science Building	1949
Graceland College	Science Hall	1954
Grinnell College	Science Hall	1952
Morningside College	Jones Hall of Science	1948
	O'Donoghue Observatory	1951
Simpson College	Carver Science Hall	1956
Kansas		
Bethany College	Nelson Science Hall	1957
College of Emporia	Mabee Science Hall	1957
Kansas State University of Agriculture and Applied Science	Bushnell Hall (32)	1949
Southwestern College	Mossman Hall of Science	1951
University of Kansas	Malott Hall (33)	1954
	Radioactive Isotope Research Laboratory	1951
Kentucky		
Bellarmine College	Science Building	1950
Bethel College	Science Building	1948
Murray State College	Science Building	1950
Louisiana		
Centenary College	Science Hall	1949
McNeese State College	Science Building	1956
Xavier University	Science Building	1948
Maine		
Bowdoin College	Parker Cleaveland Hall (33)	1952
Colby College	Chemistry Building (33)	1950
	Life Science Building	1952
Maryland		
Hood College	Lillian Brown Hodson Science Hall	1957
University of Maryland	Chemistry Building	1951
	Engine Research Laboratory (35)	1955
Massachusetts		
Amherst College	Biology Greenhouse (32)	1952
Bradford Durfee College of Technology	Leslie B. Coombs Science Hall	1952
Brandeis University	Kalman Science Building #65 (33)	1956
Emmanuel College	Science Building	1950
Harvard University	Gordon McKay Laboratory of Applied Science (35)	1952
Mount Holyoke College	Cleveland Hall and Carr Laboratories	1954
Smith College	Research Greenhouse (36)	1952
University of Massachusetts	Animal Isolation Building (32)	1951
	Chemistry Laboratory Addition (33)	1957
	Elm Disease Control Laboratory (32)	1948
	Paige Laboratory (32)	1949
Michigan		
Ferris Institute	Science Building	1955
Flint Junior College	Mott Arts and Science	1955
Henry Ford Community College	Science Building	1955
Kalamazoo College	Upton Science Hall	1956
Michigan College of Mining and Technology	Civil and Geology Building	1957
Michigan State University of Agriculture and Applied Science	Experimental Animal House (32)	1940
	Physics and Mathematics Building	1949
	Natural Science Building	1948
Minnesota		
Hamline University	Drew Science Building	1951
St. Mary's College	Science Building	1954
University of Minnesota, Duluth Branch	Science Building	1950
	Seismograph Building (35)	1953
Mississippi		
Itawamba Junior College	Science Building	1957

State and institution	Name of building	Year
Mississippi--con.		
Jackson State College	Science Building	1956
Mississippi State College for Women	Hooper Science Hall	1955
Mississippi State University	Chemical Engineering Building	1956
Tougaloo Southern Christian College	Chemistry Building	1948
Missouri		
Hannibal-LaGrange College	Muir Science Hall	1949
Northeast Missouri State Teachers College	Science Hall (32)	1955
St. Louis University	Carr Lane Building	1955
University of Missouri, Columbia	Schlundt Hall Annex	1950
Washington University	Louderman Hall (33)	1951
Westminster College	Biology Building	1948
Montana		
Carroll College	Science Building	1957
Eastern Montana College of Education	Science Building	1948
Montana School of Mines	Physics-Petroleum Building	1953
Montana State College	Isotope Laboratory (35)	1953
Nebraska		
Creighton University	Chemistry Building	1949
Hastings College	Science Hall	1955
University of Nebraska	Botany Greenhouse (32)	1950
New Jersey		
Fairleigh Dickinson University, Teaneck Campus	Science (and Dental) Building	1956
Princeton University	Building A-Matterhorn Laboratory (35)	1951
Rutgers, The State University	Microbiology (32)	1953
Seton Hall University, South Orange	Science Building	1953
Shelton College	Science Building	1953
New Mexico		
Eastern New Mexico University	Science Building	1949
New Mexico Highlands University	Science Hall	1956
New Mexico State University of Agriculture, Engineering and Science	Chemistry Building	1956
	Insectary (32)	1950
	Physical Science Laboratory Annex (35)	1949
New Mexico Western College	Science Building	1957
University of New Mexico	Biology Building	1951
	Chemistry Building	1952
	Geology Building	1953
	Physics-Meteoritics Building (35)	1952
	Research Center (36)	1948
New York		
Broome Technical Community College	Science Building	1957
City College of The City University of New York	Chemical Engineering Building	1949
Clarkson College of Technology	Physics Building	1949
Columbia University	Pegram Laboratory (35)	1955
Cornell University	Ornithology Laboratory (32)	1956
LeMoyne College	Science Building	1948
Manhattan College	Hayden Science Hall	1953
Rensselaer Polytechnic Institute	Blaw-Knox I and II (35)	1948
	Sampson Lodge (31)	1956
Syracuse University	Lubin Hall	1955
University of Buffalo	Carbon Research Building (36)	1957
University of Rochester	Cyclotron Building (35)	1948
North Carolina		
Agricultural and Technical College of North Carolina	Hines Hall (33)	1950
Atlantic Christian College	Moye Science Hall	1956
Chowan College	Green Science Building	1956
Duke University	Physics Building	1950
Elizabeth City State Teachers College	Science Hall	1952
North Carolina College at Durham	Biology Building	1956
State College of Agriculture and Engineering of the University of North Carolina	Robertson Pulp and Paper Laboratory (33)	1956
Wake Forest College	Science Building (33)	1956
Ohio		
Central State College	Banneker Science Building	1950
The Ohio State University	Physics Building	1951

State and institution	Name of building	Year
Oklahoma		
Bethany-Nazarene College	Science Hall	1950
Northeastern State College	Science Building	1956
Phillips University	Science Hall	1949
University of Oklahoma, Norman	Gould Hall (Geology)	1951
	Insectary (32)	1953
	Plant Science Greenhouse (32)	1952
	Research Institute	1948
The University of Tulsa	Petroleum Science Building	1950
Oregon		
Oregon State College	Cyclotron Building	1949
Reed College	Chemistry Building	1948
University of Oregon, Eugene	Science Hall	1949
Pennsylvania		
Bucknell University	Olin Science Building	1955
College Misericordia	Hafey Memorial Science Hall	1956
Drexel Institute of Technology	Basic Science Building	1956
Duquesne University	Graduate Chemistry Building	1948
Gwynedd-Mercy Junior College	Science Laboratory	1951
Hahnemann Medical College and Hospital	Mary Bailey Foundation	1955
Lafayette College	Olin Hall of Science	1956
Lock Haven State College	Ulmer Hall	1952
Lycoming College	Science Building	1957
Mansfield State College	Science Building	1949
Pennsylvania State University	Mineral Science	1949
	Nittany Heat and Stoker Laboratory (36)	1948
Rosemont College	Science Hall	1951
University of Pennsylvania	Betatron Laboratory Building (35)	1948
	Physical Sciences Building (35)	1952
University of Pittsburgh	Clapp Hall	1957
University of Scranton	Loyola Hall of Science	1956
Wilkes College	Stark Hall	1957
Puerto Rico		
University of Puerto Rico	Natural Science Building	1949
Rhode Island		
Brown University	Engineering Research Laboratory (35)	1948
University of Rhode Island	Pastore Laboratory	1952
South Carolina		
Clemson Agricultural College	Chemistry Building	1952
Coker College	William Chambers Coker Science Building	1951
Erskine College	Reid Science Hall	1949
Tennessee		
Knoxville College	A. K. Stewart Science Hall	1957
Texas		
Agricultural and Mechanical College of Texas	Agronomy Field Laboratory (36)	1952
	Biological Science Building	1950
	Entomology Laboratory (36)	1950
	Horticulture Greenhouse (36)	1955
	Biochemistry Laboratory (32)	1957
Howard County Junior College	Science Building I	1951
	Science Building II	1957
Huston-Tillotson College	Science Building	1955
Incarnate Word College	Science Hall	1949
Lamar State College of Technology	Biology-Geology Building	1957
Midwestern University	Geology Building	1949
Odessa College	Science Building	1949
St. Mary's University of San Antonio	Garni Science Building	1952
San Antonio College	Science Building	1953
Southern Methodist University	Fondren Science Building	1949
Southwestern University	Fondren Science Hall	1954
Texas Christian University	Science Building	1952
Texas Technological College	Science Building	1951
Texas Western College	Science Building	1950
Trinity University	Science Building	1953
University of Dallas	Science Building	1956
University of St. Thomas	Science Building	1948

State and institution	Name of building	Year
Texas--con.		
University of Texas, Austin	Balcones Research Center	
	Alloy Plant (32)	1949
	Carbonation (36)	1949
	Dolomite Service (36)	1949
	Mag. Cells (32)	1949
	Mag. Cells Service (32)	1949
	Rectifier and Switch-Gear (35)	1949
	Defense Research Laboratory (36)	1949
	Experimental Science Building	1952
Wayland Baptist College	Science Building	1953
Utah		
Brigham Young University	Eyring Science Center	1950
Utah State University of Agriculture and Applied Science	Research Shop (36)	1951
Weber College	Life Science Building	1952
	Physical Science	1952
Westminster College	Science Hall	1949
Vermont		
Norwich University	Cabot Science Hall	1952
State Teachers College, Castleton	Science Building	1954
Virginia		
Bridgewater College	Bowman Hall	1952
Emory and Henry College	Science Building	1956
Longwood College	Greenhouse (32)	1951
	Stevens Hall	1951
Madison College	Burruss Science Hall and Greenhouse	1953
Richmond Professional Institute	Science Building	1950
University of Virginia	Physics Building	1953
	State Geological Survey Building (36)	1950
Washington		
Grays Harbor College	Science Building	1957
Olympic College	Science Building	1954
Walla Walla College	Biology Building	1948
West Virginia		
Concord College	Science Hall	1951
Marshall University	Science Building	1951
Potomac State College of West Virginia University	Science Hall	1949
West Virginia State College	Science Building	1952
West Virginia University	Brooks Hall (35)	1950
	Physics Building	1952
Wisconsin		
Edgewood College of the Sacred Heart	Mazzuchelli Science Building	1955
The Institute of Paper Chemistry	General Activities Building (36)	1954
	Genetics Building (32)	1954
Marquette University	Science Annex (32)	1950
University of Wisconsin, Madison	Bacteriology Building	1954
	Chemical Engineering Building	1951
	Enzyme Institute (32)	1949
	Genetics Research Laboratory (32)	1957

List B.--Science Facilities Planning Bibliography

1. AEC Central Research Laboratory. In Buildings for Research. New York: F. W. Dodge Corporation, 1958. p. 43-48.

2. Alexander, Robert E. Designing for Science at Orange Coast College. American School and University, 31:77-84, 1959-1960.

3. _____. Science: Facility Design. In New Dimensions in Junior College Planning. Stanford, Calif.: School Planning Laboratory, School of Education, Stanford University, 1958. p. 90-97.

4. Allen, C. J. Lab Hoods Rid Fumes, Exhaust Building in New Life Sciences Research Center. Heat Piping and Air Conditioning, 34:11, 107-112, November 1962.

5. Bardwell, E. P. Lighting the Laboratory Table. College and University Business, 24:6, 42-43, June 1958.

6. Barrett, J. C. Design Techniques for Ventilating Research Labs. Air Engineering, 4:1, 31-36, January 1962.

7. Bilger, L. N., and E. M. Bilger. New Chemical Laboratory of the University of Hawaii. Journal of Chemical Education, 31:300-302, June 1954.

8. Bogne, Olaf. Science Building for Small College and Theological Seminary. College and University Business, 8:3, 37-39, March 1950.

9. Braestrup, Carl B., and Edith Quimby. Hospital Radioisotope Laboratories. Progressive Architecture, 33:84-87, December 1952.

10. Braidech, Mathew M. How to Keep Bulk Chemicals from Becoming Fire Hazards. College and University Business, 32:2, 59-61, February 1962.

11. Brazier, Bernis E., and Elisabeth Kendall Thompson. Laboratories for Radioactive Research. In Buildings for Research. New York: F. W. Dodge Corporation, 1958. p. 28-35.

12. Brewster, R. Q., and J. D. Stranathan. Science Building at the University of Kansas. American School and University, 26:373, 1954-1955.

13. Broadfoot, Albert. Problems Which Must Be Solved in Designing Science and Music Facilities for Community Junior Colleges. In Proceedings: Conference on Junior College Facilities. Tallahassee, Fla.: State Department of Education, 1959. p. 36-38.

14. Browne, W. Chester. Planning for the Atomic Age. College and University Business, 28:2, 42-45, February 1960.

15. Buildings for Research. New York: F. W. Dodge Corporation, 1958. 224 p.

16. Burford, W. R. Science Building. Cotati, Calif.: Sonoma State College, October 1961. 72 p.

17. Butler, John H. How to Put the Squeeze on Teaching Lab Cost. College and University Business, 31:2, 39-40, August 1961.

18. Carmichael, O. C., Jr. Laboratory for Research in Radioactivity. College and University Business, 22:4, 48-50, April 1957.

19. Carpenter, C. R. That's Teaching by TV. College and University Business, 24:3, 45-46, March 1958.

20. Chemical Engineering Building, University of Minnesota. Architectural Record, 109:5, 126-131, May 1951.

21. Chemical Engineering Building, University of Minnesota. In Buildings for Research. New York: F. W. Dodge Corporation, 1958. p. 162-167.

22. Cochran, F. Lee. Science Centers Take Shape in Many Forms. College and University Business, 34:6, 45-47, June 1963.

23. Cocking, Walter D. Educational Planning of College Plants. American School and University, 29:111-120, 1957-1958.

24. Coleman, H. S., ed. Laboratory Design. New York: Reinhold Publishing Corporation, 1951. 393 p.

25. Construction Problems of an Atomic Lab. In Buildings for Research. New York: F. W. Dodge Corporation, 1958. p. 36.

26. Control and Removal of Radioactive Contamination in Laboratories and Hospitals, Handbook 48. Washington: National Bureau of Standards, December 15, 1951. 24 p.

27. Cornell, Francis G., and Edwin B. Cromwell. For Science Facilities Planning Becomes Crucial. College and University Business, 30:2, 52-55, February 1961.

28. Davidson, Philip. University of Louisville Erects Building for the Natural Sciences. College and University Business, 13:1, 41-43, July 1952.

29. DeBernardis, Amo, and others. Television Facilities. In Planning Schools for New Media. Portland, Ore.: Division of Education, Portland State College, 1961. p. 59-65.

30. DeMonte, Louis A. Low-Cost, Low-Maintenance Domes Were "Dropped" From the Sky. College and University Business, 34:2, 72, February 1963.

31. The Design of Research Laboratories. London, Eng.: Division for Architectural Studies of the Nuffield Foundation, Oxford University Press, 1961. 211 p.

32. Dickinson, B. H., and Robert H. Noble. The Physics-Mathematics Building at Michigan State College. American Journal of Physics, 18:378-385, September 1950.

33. Digest of a Restudy of the Needs of California in Higher Education. Berkeley: The University of California Printing Department, 1955. p. 85-87.

34. Educational Specifications for the College Heights Campus. San Mateo, Calif.: College of San Mateo, June 1958. p. 26-28, 99-115.

35. Electronics Research Laboratory. Architectural Record, 132:5, 180-182, November 1962.

36. Equipment Needs and Floor Layouts for the New Engineering and Science Building. Fort Wayne, Ind.: Indiana Technical College, 1956. 49 p.

37. First, M. W. New Techniques in Laboratory Ventilation. Air Engineering, 1:5, 27-31, August 1959.

38. Fitch, J. M. Building of Rugged Fundamentals; University of Pennsylvania Richards-Medical Research Building. Architectural Forum, 113:82-87+, July 1960.

39. Forrester, J. D. New Geology Building at University of Arizona. American School and University, 32:105-108, 1960-1961.

40. Fox, Gertrude (compiler). Design of Laboratory Facilities: A Classified List of Selected References, 1947-1962. Bethesda, Md.: Research Facilities Planning Branch, Division of Research Services, National Institutes of Health, Public Health Service, U.S. Department of Health, Education, and Welfare, 1962. 15 p.

41. _____. Design of Laboratory Facilities: A Classified List of Selected References, Supplement I. Bethesda, Md.: Research Facilities Planning Branch, Division of Research Services, National Institutes of Health, Public Health Service, U. S. Department of Health, Education, and Welfare, July 1963. 6 p.

42. Freese, Gordon P. Exploring the Possibilities of Teaching by Closed-Circuit Television. College and University Business, 24:2, 24-26, February 1958.

43. General Electric Research Laboratory. Architectural Record, 108:1, 124-127, July 1950.

44. General Motors Technical Center. Architectural Forum, 95:111, November 1951.

45. Grinstead, N. B. Applied Arts and Science Building at Central Missouri State College. Industrial Arts and Vocational Education, 49:52-58, March 1960.

46. Haines, Charles. Planning the Scientific Laboratory. Architectural Record, 108: 107-123, July 1950.

47. Halstead, Edward Grey. Laboratory Equipment. Progressive Architecture, 37:9, 126-137, September 1956.

48. Hauf, Harold D., and others. New Spaces for Learning--Designing College Facilities to Utilize Instructional Aids and Media, Report of a Research Project. Troy, N.Y.: School of Architecture, Rensselaer Polytechnic Institute, June 1, 1961. 134 p.

49. Heavy Ion Accelerator Building. In Buildings for Research. New York: F. W. Dodge Corporation, 1958. p. 59-61.

50. Hengst, Herbert R., ed. The Planning and Utilization of Instructional Facilities, Conference Proceedings. East Lansing, Mich.: Center for the Study of Higher Education, Michigan State University, August 8-9, 1960. 156 p.

51. Hertenstein, Wesley. Laboratory Furniture Standard Units, California Institute of Technology. In Minutes of the Forty-Eighth Annual Meeting (July 3-7, 1961). Corvallis, Oreg.: National Association of Physical Plant Administrators of Universities and Colleges, Oregon State University. p. 191-196.

52. Hickman, Roger W., Edwin C. Kemble, and Leonard K. Nash. Allston Burr Lecture Hall, Harvard University. American Journal of Physics, 22:486-489, October 1954.

53. Hurd, Paul DeH. Science Facilities for the Modern High School. (Educational Monograph No. 2, School of Education.) Stanford, Calif.: Stanford University Press, 1954. 52 p.

54. _____. Science: Instructional Trends. In New Dimensions in Junior College Planning. Stanford, Calif.: School Planning Laboratory, School of Education, Stanford University, 1958. p. 86-87.

55. Hyde, Bryden B. Housing the Physical Sciences. College and University Business, 23:2, 35-36, August 1957.

56. King, Sol. Life Sciences Building Accommodates People and Animals--Separately. College and University Business, 34:6, 52-56, June 1963.

57. Kohler, O. C., and D. W. Orr. Housing the Chemistry Department at Mount Holyoke. American School and University, 28:391-394, 1956-1957.

58. Kosoloski, John E. Planetaria Data. Harrisburg, Pa.: Bureau of Curriculum Services, Department of Public Instruction, Commonwealth of Pennsylvania, July 1960. 13 p. (Mimeographed)

59. Laboratory Design for Handling Radioactive Materials. (Research Conference Report No. 3.) Washington: Building Research Advisory Board, National Research Council-National Academy of Sciences, 1952. 140 p.

60. Laboratory Exhaust Hood Ventilation Standards for the University of Michigan. Ann Arbor: University of Michigan, 1961. 25 p.

61. Laboratory Service Piping. In Time-Saver Standards. (Edition No. 2.) New York: F. W. Dodge Corporation, 1950. p. 788-789.

62. Leonard, J. C. New Natural Science Building. American School and University, 22: 141-144, 1950-1951.

63. Lewis, Charles A., and Alexander F. Cipa. Easy to Use, Easy to Maintain--That's Wayne University's Science Hall. College and University Business, 9:6, 32-55, October 1950.

64. Lewis, Harry F., ed. Laboratory Planning for Chemistry and Chemical Engineering. New York: The Committee on Design, Construction, and Equipment of Laboratories, Division of Chemistry and Chemical Technology, National Research Council, Reinhold Publishing Corporation, 1962. 544 p.

65. Lewis, H. F. General Problems of Laboratory Design. American School and University, 22:309-312, 1950-1951.

66. London and Home Counties Branch of the Institute of Physics. The Design of Physics Research Laboratories. New York: Reinhold Publishing Corporation, 1959. 108 p.

67. Ludlum, R. P. Student-Constructed Science Building. Journal of Chemical Education, 34:506, October 1957.

68. Mackintosh, A. D. Architectural Problems in Atomic Labs. In Buildings for Research. New York: F. W. Dodge Corporation, 1958. p. 37-42.

69. Martin, Deac. Lighting the Laboratory. College and University Business, 14:1, 46-47, January 1953.

70. Maurer, H. What the Chairman of a Science Building Project Should Know. American School and University, 22:119-122, 1950-1951.

71. Meissner, W. A. Laboratory Planning--Bibliography. (References 1944-1955.) Boston, Mass.: New England Baptist Hospital, 1956. 4 p.

72. More Harvard: A Flexible Laboratory Building to Meet the Changing Needs of Science. Architectural Forum, 98:126-127, June 1953.

73. Morgan, Dane D. Science Building for a Large Junior College. College and University Business, 21:3, 38-39, September 1956.

74. Museum in the Corridor Proves Two-Way Asset. College and University Business, 33:1, 39, July 1962.

75. National Education Association. Mathematics and Science Teaching and Facilities. Washington: The Association, Research Division, 1959. 49 p.

76. The National Science Teachers Association. College Facilities for the Education of Science Teachers. In School Facilities for Science Instruction. Washington: The Association, 1954. p. 199-216.

77. New Physical Sciences Building. University of Kansas Alumni Magazine, 53:8-9, 12-14, October 1954.

78. News...Research Grant from E.F.L. College and University Business, 32:1, 62, January 1962.

79. Nuclear Science Center. Overview, 1:58, October 1960.

80. Nuclear Studies Laboratory. Progressive Architecture, 33:79-83, December 1952.

81. Oetjen, Robert A., and John N. Cooper. The New Physics Building at the Ohio State University. American Journal of Physics, 21:221-227, March 1953.

82. Palmer, R. Ronald (director). Project on Design of Physics Buildings: Selected Reprints of Articles on Physics Buildings. New York: American Institute of Physics, June 1959. 183 p.

83. Palmer, R. Ronald, and William Maxwell Rice. Modern Physics Buildings: Design and Function. New York: Reinhold Publishing Corporation, 1961. 324 p.

84. Paseur, C. Herbert. Science Hall Carries Utility Services in Its Walls. College and University Business, 34:6, 48-51, June 1963.

85. Peterson, J. E., and J. A. Peay. Laboratory Fume Hoods. Air Conditioning, Heating, and Ventilating, 60:5, 63-72, May 1963.

86. Pheonix Project. In "College Buildings." Architectural Record, 117:1, 136, January 1955.

87. Pierce, George F., Jr. Here is a Practical Approach to Laboratory Design. College and University Business, 26:3, 40-43, March 1959.

88. Poole, Lynn. Science Via Television. Baltimore, Md.: Johns Hopkins Press, 1950. 198 p.

89. Proposed Physics Building for Yale University. Architectural Record, 114:3, 141-147, September 1953.

90. Radiation Research Goes Underground in Boston. Progressive Architecture, 43:12, 44, December 1962.

91. Radiochemistry Building. In Buildings for Research. New York: F. W. Dodge Corporation, 1958. p. 49-51.

92. Railsback, G. L., and H. M. Skadeland. No Idle Space with This Multiple Lab. College and University Business, 27:1, 25-28, July 1959.

93. Rasmussen, H. B., and others. Symposium on College and University Chemistry Equipment and Supplies. Journal of Chemical Education, 27:385-398, July 1950.

94. Rice, William M., and Elisabeth K. Thompson. The Design of Particle Acceleration Buildings. In Buildings for Research. New York: F. W. Dodge Corporation, 1958. p. 52-58.

95. Richardson, John S., ed. School Facilities for Science Instruction. Washington: The National Science Teachers Association, 1954. p. 199-257.

96. Richardson, John S., and G. P. Cahoon. Methods and Materials for Teaching General and Physical Sciences. New York: McGraw-Hill Book Company, Inc., 1951. 485 p.

97. Richardson, John S., G. P. Cahoon, and Ralph W. Lefler. Facilities for Science Teacher Education. American School and University, 24:299-308, 1952-1953.

98. Robertson, G. R. Chemistry at UCLA. Journal of Chemical Education, 30:526-529, October 1953.

99. _____. Design of a Chemistry Lecture Room. Journal of Chemical Education, 36:197-201, April 1959.

100. _____. New Fundamental Designs for Academic Chemistry Buildings. Journal of Chemical Education, 38:474-477, September 1961.

101. Santoro, Louis L. Physics and Electrical Engineering Research Building. American School and University, 30:359-366, 1958-1959.

102. Schwehr, Frederick E. Program Statement for a New Science Building at Wisconsin State College, La Crosse. Madison, Wis.: Board of Regents of State Colleges, The State of Wisconsin, n.d. 43 p. (Dittoed)

103. Science and Pharmacy Buildings for Drake University. Progressive Architecture, 31:11, 65-89, November 1950.

104. Science Building, Bemidji State College. St. Paul, Minn.: Department of Administration, State College Board, November 15, 1959. 57 p.

105. Science Buildings Key the New Campus. Architectural Record, 122:2, 170-171, August 1957.

106. Scientific Apparatus Makers Association. Here's the Simple, Safe, Sure Way to Plan and Purchase Laboratory Facilities. Chicago: The Association, 1951. 15 p.

107. Scientists Build to a Human Scale. Overview, 1:60-61, September 1960.

108. Scully, Mark F., and Francis G. Cornell. Obsolescence and Modernity in College Plant Facilities. American School and University, 31:47-50, 1959-1960.

109. Sell, J. C. Planning the Electron Microscopy Suite. Journal of the American Institute of Architects, 39:5, 83-87, May 1963.

110. Services the Keynote to New Laboratory Design. Industrial Architecture, 5:4, 240-244, April 1962.

111. Sharefkin, David M. How to Dispose of Chemical Wastes. College and University Business, 30:6, 43-44, June 1961.

112. Stranathan, J. D., and R. Q. Brewster. Science Building at the University of Kansas. American School and University, 26:373-378, 1954-1955.

113. Swinburne, Herbert H. How La Salle College Set Its Site for a New Science Building. College and University Business, 32:2, 57-58, February 1962.

114. Taylor, Harold. New Thinking on College Buildings. Architectural Forum, 98:116-145, June 1953.

115. Tentative Minimum Standards: Wood Laboratory Equipment. Chicago, Ill.: Scientific Apparatus Makers Association, January 1, 1962. 23 p.

116. Thompson, Elisabeth K. For an Architecture of Nuclear Buildings. In Buildings for Research. New York: F. W. Dodge Corporation, 1958. p. 62.

117. Viles, Frederick J., Jr. Design and Uses of Laboratory Hoods. College and University Business, 22:6, 41-44, June 1957.

118. Walker, R. J. Laboratory Air Supply Systems. American Society of Heating, Refrigeration, and Air Engineers Journal, 5:3, 47-48, March 1963.

119. Ward, Donald R. Design of Laboratories for Safe Use of Radioisotopes. Oak Ridge, Tenn.: Advisory Field Service Branch, Isotope Division, Atomic Energy Commission, November 1952. 48 p.

120. Watson, R. B. Addition to the Physics Building at the University of Texas. American Journal of Physics, 29:50-56, January 1961.

121. Watts, Ralph J. Science Building Remodeled. College and University Business, 8:2, 28-30, February 1950.

122. What They're Building: Even the Present Is Only Prologue. College and University Business, 34:6, 59-61, June 1963.

123. Wiegand, W. H. Planning the Physical Plant for Teaching by Television. College and University Business, 25:3, 35-38, September 1958.

124. Yarbrough, David B. The Team Approach to Planning a College Science Building. (Investigation No. 5.) Houston, Tex.: Caudill, Rowlett and Scott, September 1960. 48 p.

GPO 876-951

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
OFFICE OF EDUCATION
WASHINGTON, D.C. 20202

OFFICIAL BUSINESS

POSTAGE AND FEES PAID
U.S. DEPARTMENT OF H.E.W.

OTHER PHYSICAL FACILITIES SERIES PUBLICATIONS

OE-51004-1
Inventory of Higher Education Physical Facilities. February 1962.

OE-51004-3
Library Facilities Planning Aids. March 1962.

OE-51004-4
Student Accommodations in Instructional Facilities, 1960-61 and Planned for 1965-66. July 1962.

OE-51004-5
Student Accommodations in Residential Facilities, 1960-61 and Planned for 1965-66. July 1962.

OE-51004-6
Expenditures Planned for Higher Education Facilities, 1961-65. July 1962.

OE-51004-7A
Classroom Facilities Planning Aids. March 1964.

OE-51004-8
Married-Student Apartment Planning Aids. July 1962.

OE-51004-9A
Residence Hall Planning Aids. February 1964.

OE-51004-10
Campus Parking Bibliography. August 1962.

OE-51004-11
Student Infirmary Planning Aids. August 1962.

OE-51004-12A
Space Utilization Bibliography. January 1964.

OE-51004-13
College Union Planning Aids. August 1962.

OE-51004-14
Gross Area of Non-Residential Buildings, by Facilities Category. September 1962.

OE-51004-15
New Construction and Rehabilitation on College Campuses, 1959-60. August 1962.

OE-51004-16
Assignable Area of College and University Buildings, by Facilities Category, Function, and Type of Institution. April 1963.

OE-51004-17
Ratio of Equipment Investment to Building Investment. June 1963.

OE-51004-18
New Construction and Rehabilitation on College Campuses, 1961-62. November 1963.